

REMARKS

The Office Action mailed June 14, 2007 considered claims 1-9, 11, 36-38 and 50-59. Claims 1-2, 4, 7, 9-11 and 36-38 were rejected under 35 U.S.C. 103(a) as being unpatentable over Zondervan et al. (US 6,516,327) hereinafter *Zondervan* in view of Chu et al. (US 6,493,720) hereinafter *Chu*. Claims 3, 5, and 8 were rejected under 35 U.S.C. 103(a) as being unpatentable over *Zondervan* in view of *Chu* and further in view of Jim Challenger, et al. "A scalable system for Consistently Caching Dynamic Web Data" hereinafter *Challenger*. Claim 6 was rejected under 35 U.S.C. 103(a) as being unpatentable over *Zondervan* in view of *Chu* and further in view of Dettinger et al. (US 2003/0093413) hereinafter *Dettinger*. Claims 50-59 were rejected under 35 U.S.C. 103(a) as being unpatentable over *Zondervan* in view of *Chu* and further in view of Shaul Dar, et al. "Semantic Data Caching and Replacement" hereinafter *Dar*.¹

By this amendment claims 1, 36, and 50-59 are amended and claim 60 is new.²

The present invention is generally directed to registering for and retrieving database table change information that can be used to invalidate cache entries. For example, claim 1 is directed to formulating a Web based response. A data table is selected to be monitored for content changes. The selected data table is selected from among the one or more data tables of the database. A record for the selected data table is inserted into a separate change notification table. The record includes versioning information identifying and corresponding to the selected data table. The versioning information is retrievable by the Web server to determine when a corresponding cache entry containing cacheable content from the selected data table is invalid.

A trigger is assigned to the selected data table. The trigger is configured to update the versioning information for the selected table in the change notification table when content in the selected data table is altered. Interim results that can be used in the generation of a plurality of different Web responses are cached in a cache entry in the cache. The interim results are based on one or more records from the selected data table and one or more records from one or more other

¹ Although the prior art status of the cited art is not being challenged at this time, Applicant reserves the right to challenge the prior art status of the cited art at any appropriate time, should it arise. Accordingly, any arguments and amendments made herein should not be construed as acquiescing to any prior art status of the cited art.

² Support for the amendments to the claims are found throughout the specification, Figures, and previously presented claims, including, paragraphs [0019]- [0021], [0048], [0050]-[0054], [0060], [0065] – [0067], and [0073], and Figures 1, 2, 3, and 4.

data tables. The cache entry includes the versioning information identifying and corresponding to the selected data table

A Web based request for a Web based response that is to include the interim results is received subsequent to caching the interim results in the cache entry. The change notification table is queried for versioning information identifying and corresponding to the selected data table. The current versioning information identifying and corresponding to the selected data table is received. The cached versioning information is compared to the current versioning information.

It is determined how to access the interim results for inclusion in a Web based response based on the results of comparing the versioning information and in response to receiving the Web based request for the portion of content. The interim results are accessed in accordance with the determination. A constructing a Web based response responsive to the Web based request is constructed based on the interim results.

Claim 36 is a computer program product corresponding to claim 1.

Claim 60 is directed to invalidating a cache entry. A data table is selected o be monitored for content changes. The selected data table is selected from among the one or more data tables of the database. A record for the selected data table is inserted into a separate change notification table. The record includes versioning information identifying and corresponding to the selected data table. The versioning information is retrievable by the Web server to determine when a corresponding cache entry containing cacheable content from the selected data table is invalid.

A trigger is attached to the selected data table. The trigger is configured to update the versioning information for the selected table in the change notification table when any record in the selected data table is altered regardless of the mechanism used to alter the record. Interim results are contrasted from a collection of records, including a plurality of records in the selected data table and one or more records from one or more other data tables. The interim results are usable in the generation of a plurality of different Web responses. The interim results are cached in a cache entry in the cache. The cache entry including the versioning information identifying and corresponding to the selected data table;

A cache interface module issues a blocking querying to the change notification table for versioning information identifying and corresponding to the selected data table. The blocking query blocks on the change notification table until versioning information for the selected table is

updated. A change to a record in the selected data table is detected subsequent to issuance of the blocking query. The assigned trigger updates the versioning information for the selected table in the change notification table subsequent to issuance of the blocking query.

The cache interface module receives the updated versioning information in response to the blocking query. The cached versioning information is compared to the updated versioning information. The cache entry for the interim results is invalidated based on the results of the comparison.

Applicants respectfully submit that the cited art of record does not anticipate or otherwise render the amended claims unpatentable for at least the reason that the cited art does not disclose, suggest, or enable each and every element of these claims.

Zondervan describes a system and method for synchronizing data in multiple databases. *Zondervan* describes the use of version ID mapping tables, delta tables, and replica ID tables that can be used to more effectively synchronize a secondary database (e.g., on a palmtop electronic device) with a distributed database system. (Abstract, Figure 4). An ID mapping table can comprise a plurality of entries, each entry of which contains a main database record identification number and a secondary database record identification number pairing. (Col. 6, ll. 21-23). The ID mapping table can be referred to determine if a secondary database is to be synchronized with a main database record or vice versa. (Col. 6, l. 38 – Col. 7, l. 40).

Chu describes a method and system for synchronization of metadata in an information catalog. (Title). The metadata is included in a searchable information catalog that can be searched to determine what data is available. (Col. 5, ll. 1-38). Metadata assigned to objects is used to describe the objects. (Col. 6, ll. 52-56). Thus, generally, *Chu* describes searching metadata describing objects to locate objects of interest.

A metadata synchronizer monitors one or more objects processed by other tools to determine whether metadata for other objects has changed. (Col. 3, ll. 41-43). If metadata for an object has changed, the metadata synchronizer determines whether to modify metadata for that object in the information catalog. (Col. 3, ll. 46-48). The metadata synchronizer maintains timestamps for metadata of objects for comparison purposes and to determine whether the information catalog system or the source has the most current data. (Col. 7, ll. 48-51). The time stamps can be used to resolve conflicts when multiple sources modify objects and their metadata (Col. 7, ll. 51-60).

Thus, *Chu* and *Zondervan* disclose various mechanisms for synchronizing database data amongst different database locations and updating data stored in database locations. *Chu* and *Zondervan* essentially facilitate the mirroring of an operation performed on data in one location to another location. For example, if a data value is changed at one location, the changed data value is propagated to other relevant locations (e.g., replicas or data subsets). However, neither *Chu* nor *Zondervan* disclose or suggest determining where and/or how to access interim results constructed from multiple data tables that are to be included in Web based responses.

The office action submits *Chu* teaches triggers. (Col. 7, ll. 60-61). However, this section refers to a polling mechanism for checking at regularly schedule times. The section does not however teach updating a change notification used to invalidate a cache entry caching interim results based on a one or more database records in response to altering of the records of the database. The office action also submits that triggers are well known in the art. Applicants assume from this statement that the Examiner is taking official notice of triggers. Applicants thus specifically requests that the Examiner provide references supporting the teachings officially noticed.

Accordingly, the cited art fails to teach or suggest either singly or in combination:

an act of assigning a trigger to the selected data table, the trigger configured to update the versioning information for the selected table in the change notification table when content in the selected data table is altered;

an act of caching interim results that can be used in the generation of a plurality of different Web responses in a cache entry in the cache, the interim results based on one or more records from the selected data table and one or more records from one or more other data tables, the cache entry including the versioning information identifying and corresponding to the selected data table;

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an act of querying the change notification table for versioning information identifying and corresponding to the selected data table;

an act of receiving current versioning information identifying and corresponding to the selected data table;

an act of comparing the cached versioning information to the current versioning information;

an act of determining how to access the interim results for inclusion in a Web based response based on the results of comparing the versioning information and in response to receiving the Web based request for the portion of content.

as recited in claim 1, when viewed in combination with the other limitations of claim 1.

The cited art fails to teach or suggest either singly or in combination:

an act of caching the interim results in a cache entry in the cache, the cache entry including the versioning information identifying and corresponding to the selected data table;

an act of a cache interface module issuing a blocking querying to the change notification table for versioning information identifying and corresponding to the selected data table, the blocking query blocking on the change notification table until versioning information for the selected table is updated;

an act of detecting a change to a record in the selected data table, subsequent to issuing the blocking query;

an act of the assigned trigger updating the versioning information for the selected table in the change notification table, subsequent to issuing the blocking query;

an act of the cache interface module receiving the updated versioning information in response to the blocking query;

an act of comparing the cached versioning information to the updated versioning information; and

an act of invalidating the cache entry for the interim results based on the results of the comparison.

as recited in claim 60, when viewed in combination with the other limitations of claim 60.

In view of the foregoing, Applicant respectfully submits that the other rejections to the claims are now moot and do not, therefore, need to be addressed individually at this time. It will be appreciated, however, that this should not be construed as Applicant acquiescing to any of the purported teachings or assertions made in the last action regarding the cited art or the pending

application, including any official notice. Instead, Applicant reserves the right to challenge any of the purported teachings or assertions made in the last action at any appropriate time in the future, should the need arise. Furthermore, to the extent that the Examiner has relied on any other Official Notice, explicitly or implicitly, Applicant specifically requests that the Examiner provide references supporting the teachings officially noticed, as well as the required motivation or suggestion to combine the relied upon notice with the other art of record.

In the event that the Examiner finds remaining impediment to a prompt allowance of this application that may be clarified through a telephone interview, the Examiner is requested to contact the undersigned attorney at 801-533-9800.

Dated this 31st day of October, 2007.

Respectfully submitted,



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